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AMENDMENTS TO THE SPECIFICATION

- Please amend the paragraph in the Background of the Invention section, item 2. Description of the Related Art, which begins on page 1, line 13, as follows:

With the rapid growth of the Internet, more and more business and residential users are beginning to rely on the Internet for their mainstream and mission-critical activities. As is known, the Internet typically refers to a number of data service systems connected together via a high speed interconnect network (see ~~Figure~~FIG. 1 (PRIOR ART)). Each data service system typically includes Internet server applications that host content for various customers. The Internet server applications can also host applications. Remote user terminals (e.g., terminals 11a-11n in ~~Figure~~FIG. 1 (PRIOR ART)) may be connected to a data service system (e.g., the data service system 20 in ~~Figure~~FIG. 1 (PRIOR ART)) via an interconnect network. Each user terminal is equipped with a web browser (or other software such as an e-mail software) that allows the user terminal to access the contents and/or applications hosted in various data service systems.

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- Please amend the paragraph in the Background of the Invention section, item 2. Description of the Related Art, which begins on page 1, line 25, as follows:

Popular Internet applications include World Wide Web (WWW), E-mail, news, and FTP applications. All of these applications follow the client-server model and rely on the Transmission Control Protocol (TCP) for reliable delivery of information/applications between severs and user terminals. New connection requests received by a data service system (e.g., the system 20 in ~~Figure~~FIG. 2 (PRIOR ART)) are first processed by a TCP/IP stack which is part of the data service system's kernel (i.e., operating system). ~~Figure~~FIG. 2 (PRIOR ART) shows that the kernel 21 is external to the server application 25 that processes the new connection requests received. The TCP/IP stack in the kernel 21 holds the new connection requests in TCP listen queues, one queue-per port. The maximum number of requests that can be held in a listen queue is a configurable parameter. When a server application is ready to process a new request, the server application accepts a new request from its associated listen queue. At this time, the new request is removed from the listen queue.

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- Please amend the Brief Description of the Drawings section, which begins on page 6, line 4, as follows:

~~Figure~~ FIG. 1 (PRIOR ART) schematically shows the structure of the ~~Internet.~~Internet;

~~Figure~~ FIG. 2 (PRIOR ART) shows a prior art arrangement of the data service system employed in the Internet of ~~Figure 1.~~ FIG. 1 (PRIOR ART);

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~~Figure~~ FIG. 3 shows the structure of a server application system having an adaptive admission control system in accordance with one embodiment of the present ~~invention.~~invention; and

~~Figures~~ FIGs. 4A-4C show in a flowchart diagram form the process of the actuator of the adaptive admission control system of ~~Figure 3.~~ FIG. 3.

- Please amend the paragraph in the Detailed Description of the Invention section, which begins on page 7, line 3, as follows:

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~~Figure~~FIG. 3 shows a server application system 40 that includes an adaptive admission control system 43 and a server application module 44. The adaptive admission control system 43 implements one embodiment of the present invention.

- Please amend the paragraph in the Detailed Description of the Invention section, which begins on page 7, line 7, as follows:

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As will be described in more detail below, the adaptive admission control system 43 includes a request queue 53 that stores incoming requests before they are fetched by the server application module 44 for services. A discard queue 51 is provided to store requests to be discarded. The discard queue 51 includes a new session request discard queue 51a and an existing session request discard queue 51b. An actuator 52 is coupled to ~~therequest~~ the request queue 53, the discard queue 51, and a listen queue 42 that is external to the server application system 40. The actuator 52 determines the input rate of requests from the listen

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queue 42 during previous processing cycles of the adaptive admission control system 43. The admission control system 43 also includes a controller 54 that is coupled to the actuator 52 and the request queue 53 to determine a target number (i.e, *Target_(in)*) of requests to be sent to the request queue 53 during a processing cycle. The controller 54 determines the target number *Target_(in)* based on the difference between the actual and desired queue occupancy (i.e., *Q_(actual)* and *Q_(desire)*) of the request queue 53. The controller 54 sends the target number *Target_(in)* to the actuator 52.

A5

- Please amend the paragraph in the Detailed Description of the Invention section, which begins on page 8, line 18, as follows:

In summary, the key of the present invention is to dynamically control admission to the server application module 44 based on the estimated rate of the incoming requests to the listen queue 42 and the queue occupancy of the request queue 53. Thus, the system 43 is an adaptive queue-based admission control system for a server application. It offers predictive admission control policy for the server application module 44. This is due to the fact that the admission control system 43 uses past history to estimate the rate of new requests coming to the server application system 40 through the listen queue 42, and the rate at which the server application module 44 processes the requests during a processing cycle (reflected as the queue occupancy of the request queue 53). In this case, the admission control system 43 is able to predict the number of requests that can be admitted for services in that cycle. The use of estimates based on past history ensures that the server application system 40 could decide to deny service to requests even before any thresholds are violated. The structure and operation of the adaptive admission control system 43 will be described in more detail below, also in conjunction with ~~Figures~~FIGs. 3-4C.

A6

- Please amend the paragraph in the Detailed Description of the Invention section, which begins on page 9, line 9, as follows:

Referring again to ~~Figure~~FIG. 3, the server application system 40 can be any kind of server application system. In one embodiment, the server application system 50 is a TCP/IP-

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based server application system. This means that the server application module 44 is a TCP/IP-based server application. A TCP/IP-based server application is a connection-based server application. An example of such an application is a web content server, an e-mail server, a news server, an e-commerce server, a proxy server, a domain name server, and a local service server. This means that the server application system 40 can be any one of the above-mentioned server systems. Alternatively, the server application system 40 can be other type of server application system.

A7

- Please amend the paragraph in the Detailed Description of the Invention section, which begins on page 11, line 11, as follows:

The access to the server application module 44 may be done by a user at an external user terminal (not shown in ~~Figure~~FIG. 3) who generates and sends at least one request directed at the server application module 44. Alternatively, an access request may be generated by a server application system wanting to access the server application system 40.

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- Please amend the paragraph in the Detailed Description of the Invention section, which begins on page 13, line 24, as follows:

As can be seen from ~~Figure~~FIG. 3, the adaptive admission control system 43 includes the actuator 52 coupled to receive requests from the external listen queue 42. The actuator 52 is also connected to the discard queue 51. The discard queue 51 includes a new session request discard queue 51a and an existing session request discard queue 51b. The actuator 52 is also connected to the request queue 53. The request queue 53 is then connected to the external server application module 44. In addition, the adaptive admission control system 43 also includes a controller 54, which is connected to the actuator 52 and the request queue 53.

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- Please amend the paragraph in the Detailed Description of the Invention section, which begins on page 17, line 11, as follows:

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The actuator 52 is responsible for ensuring that no more than the target number *Target_(in)* of requests are admitted to the request queue 53 during each processing cycle. This means that the actuator 52 ensures that no more than *Target_(in)(t)* requests are added to the request queue 53 during the processing cycle *[t, t+T]*. Here, *(t)* means that the target number *Target_(in)* is not a constant number and may change along the time axis. In addition, the actuator 52 also determines which of the incoming requests are to be sent to the request queue 53 and which of the incoming requests are sent to the discard queue 51. If the number of incoming requests are fewer than the target number *Target_(in)*, the actuator 52 also determines which requests stored in the discard queue 51 are to be taken from the discard queue 51 to the request queue 53. The operation of the actuator 52 is shown in ~~Figures~~ FIGs. 4A through 4C, which will be described in more detail below.

- Please amend the paragraph in the Detailed Description of the Invention section, which begins on page 17, line 24, as follows:

A11

Referring to ~~Figures~~ FIGs. 4A-4C, the operation of the actuator 52 is shown with respect to a particular processing cycle *[t, t+T]*. The process starts at the step 70. At the step 71, the actuator 52 estimates the number of requests to come in to the server application system 40 during the current processing cycle. This value, *in_rate_estimate(t)* can be determined based on past history. For example, the actuator 52 can use a simple weighted averaging scheme for this purpose.

- Please amend the paragraph in the Detailed Description of the Invention section, which begins on page 18, line 11, as follows:

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Then at the step 74, it is determined whether P is greater than or equal to the value of one (i.e., 1). This means that if the value P is greater than or equal to one, the actuator 52 is not expected to receive more incoming requests than the target number *Target_(in)*. If so, the

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step 75 is the next step. If P is not greater than or equal to one, the process moves to the step 85 (see ~~Figure~~FIG. 4C).

- Please amend the Abstract which begins on page 26, line 1, as follows on the next page:

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